Interstate Renewable Energy Council

Boston, Massachusetts

June 4, 2003

Mary L. Cottrell, Secretary
Department of Telecommunications and Energy
One South Station, 2nd Floor
Boston, Massachusetts 02110

Re: The Department's Investigation into Distributed Generation D.T.E. 02-38-A
Comments of the Interstate Renewable Energy Council

Dear Ms. Cottrell:

Please accept for filing the attached Comments of the Intestate Renewable Energy Council in the above referenced proceeding.

Should you have any questions, please do not hesitate to contact me at 703-536-9393 or ccook@e3energy.com

Sincerely,

/CHRISTOPHER COOK/

Christopher Cook, Esq.

Encl

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS & ENERGY

Investigation by the Department on its own Motion into Distributed Generation	)))))	DTE No. 02-38

Comments of the Interstate Renewable Energy Council regarding
the Department's Investigation into Distributed Generation D.T.E. 02-38-A
and Tariff to Accompany Proposed Uniform Standards for Interconnecting
Distributed Generation in Massachusetts

Introduction

The Interstate Renewable Energy Council (IREC) is a membership organization formed to promote the use of renewable energy resources and technologies in the United States. IREC's members include state energy offices, city energy offices, other municipal and state agencies, national laboratories, solar and renewable organizations and companies, and individual members. IREC occupies a leadership role in promoting the simplified interconnection of small scale renewable energy technologies to the electric grid at both the state and federal levels.

Comments

IREC's comments will focus exclusively on the proposed tariff section 4.2.4.1(b) **Group 1 Facilities -External Disconnect Switch**. That proposed section states in part,

> For qualified inverters, the Company **may** require an external disconnect switch (or comparable device by mutual agreement of the Parties) at the PCC with the Company or at another mutually agreeable point that is accessible to Company personnel at all times and that can be opened for isolation if the switch is required (emphasis in original).

This leaves the requirement for the external disconnect switch (EDS) as discretionary with a utility. IREC would submit that such unbridled discretion is subject to abuse and a utility should be

required to make a showing of need based on safety, before it can arbitrarily decide which DG customers need, and which do not need an EDS.

IREC is concerned about the added cost of an EDS especially when the utility is allowed to designate the location of the switch so that it is "accessible at all times". This could require a customer to locate the switch at a location far from the location of the customer's generator and at significant additional cost. Even in the easiest installations, the additional cost of an external disconnect switch can run into the hundreds of dollars. For small systems producing only ten or so dollars a month in electricity, the cost of the switch can consume more than a year's worth of economic output from the customer's DG system.

In most cases, the added cost of an EDS is not justified by a concomitant increase in safety value as the EDS provides critical safety protection under only one of three distribution system lineworker safety procedures. For the other two safety procedures, the EDS provides little if any added safety value and actually could confuse lineworkers with respect to safe working conditions. Furthermore, under these conditions, the widespread use of EDSs can elongate distribution system outage restoration times.

Distribution line repair procedures must address lineworker safety with respect to the potential for accidental contact with an energized line. DG equipment on a distribution line can pose a threat to the lineworker unless safety procedures are incorporated to protect workers from accidental voltage from the DG system. The procedures utilities follow fall generically into three categories:

The **first safety approach** is to require all line workers to **work on distribution circuits as if they were energized** (i.e. live). Even if the line worker has disconnected a circuit, he or she is to wear protective gloving that would insulate them from any electrical current that was accidentally introduced

into the wires. If this distribution safety procedure is implemented and followed, DG systems poses minimal or no risk even if it were to accidentally inject voltage into the line. Since lineworkers are assuming the line is energized for safety purposes, it poses little hazard if the line is accidentally energized by a DG system[1]. Under this procedure the customer generator external disconnect serves no critical safety function.

The **second safety approach** is for line workers to **ground[2] both upstream and downstream sides of the circuit** on which they are working. The grounding prevents any current from flowing into the work area from either direction and assures the line worker cannot come into contact with harmful electrical currents. Since the downstream side is grounded, any customer sided generation would be short circuited and could not back feed lethal current. In this case, an EDS on the customer's DG serves no safety purpose.

In the **third case**, the distribution safety procedure involves **only grounding of the upstream side of the circuit**. Since there is no grounding on the downstream side, any back feed current caused by an interconnected customer generator could pose a significant risk to line workers. Under this safety approach, **requiring an EDS and opening the same would be a critical part of the distribution safety** procedure and all such switches would have to be opened and locked before a line worker could commence a repair.

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[1]It is important to note that the probability of accidental energization is extremely rare. First several automatic safety components on the DG system would have to fail and fail in the "on" mode (an event that has never occurred in inverter systems). Second, the DG system would have to exactly match the load on the isolated portion of the circuit and follow that load over time. Most DG systems would not have a capacity to support even a small portion of load on a distribution circuit and most would not have load following capability when interconnected to the grid.

[2]According to John Wiles, of the Southwest Technology Development Institute at New Mexico State University and author of "Code Corner" in *Home Power* magazine, utility line workers use grounding conductors (often called chaining) of sufficient size to eliminate the possibility of shock from full load on a distribution circuit. A conductor of this size would easily ground any customer DG equipment, whether IEEE compliant or otherwise and protect the workers from an accidental energization of the line. A customer's generator that remained connected to a grounded circuit would literally burn up.

Since the EDS adds no critical safety function under safety procedures one and two above, a utility should be required to make a showing that it utilizes the third type of lineworker safety procedure before it can exercise discretion to impose a requirement for an EDS under tariff section 4.2.4.1(b).

Requiring an EDS under either of the first two distribution line safety procedures will likely add confusion to the line worker repair procedures and could elongate outage restoration times. If a utility includes a requirement for each DG customer to install an EDS, it would be remiss if it did not incorporate the use of that switch into its distribution line repair safety procedures. Line workers will be required to visit the switch on each DG system and open and lock it out before beginning repair work. When the work is finished, the line worker will need to re-visit each switch and return it to its closed position. On distribution circuits where there are many customer DG facilities or where there is but one or more customers in a location remote from the circuit, the line worker may spend significant time visiting each disconnect switch twice.

During storms or other conditions when line workers are taxed (arguably the time when the EDS offers the most safety value), this added requirement on each circuit could significantly retard outage restoration time. Moreover, a lineworker may face a dilemma when inclement weather makes the EDS difficult to access. In the case of a system on a remote customer's premises, a lineworker may have to decide between traversing a long snow covered driveway to access the EDS, or violating a safety procedure and working on a distribution circuit without opening the switch.

The external disconnect switch is neither required under the National Electric Code nor under the Institute of Electrical and Electronics Engineers (IEEE) standards 1547 or 929. While an external disconnect is discussed in a section on isolation devices in IEEE 1547, that section states "When required by the Area EPS [utility] operating practices, a readily accessible, lockable, visible-break

isolation device shall be located between the Area EPS and the DR unit." Similar language is contained in IEEE 929.

This language, like that in the proposed tariff, suggests the utility may require a switch but does not indicate under what conditions the switch should be required. IREC would submit this requirement is included as an option in the IEEE standards to protect utilities that employ the third type of distribution safety procedure described above. It should not be interpreted as a requirement that can be arbitrarily imposed by a utility.

The National Electric Code requires at least one disconnect switch external to the inverter on a DG system that can be used to isolate a customer DG system from the building electrical service (and hence the utility grid). This switch is typically located inside the building, as the Code requires that the switch be located near the main disconnect for the utility service to the building. In most circumstances, an external disconnect could not be used as the disconnect required by the Code as the Code required switch must be within sight of the main utility service for the building.

One of the purposes of the Code switch is to allow emergency personnel to disconnect the generating source in an emergency. While it may be located inside a building, the experts that developed the Code have concluded that even though it is so located, it is nonetheless accessible for emergency personnel. There is no reason why this same Code required switch could not also be used by utility personnel in cases of emergency.

In non-emergency conditions, the utility should be expected to contact the owner of the generator and schedule an outage of the generator to perform repairs. Once contacted and scheduled, the customer can provide utility access to the switch required by the Code, or open the switch themselves. Notice to the customer-generator of non-emergency repairs is typically required as part of

the contract or tariff agreement governing operation of the customer distributed generator. In both emergency and non-emergency circumstances, the switch already required by the National Electric Code could perform the same function as the redundant external disconnect switch in proposed Tariff Section 4.2.4.1(b).

Even if a utility cannot gain access to the Code required disconnect, it always has the option of removing the customer's meter which will completely disconnect any customer sited generation. Meter removal also discontinues service at the customer's site and customers should be made aware of this possibility if have no external disconnect switch.

Conectiv, an electric utility serving Delaware and parts of adjoining states, allows customers with generation to forgo an external disconnect switch and instead designate the utility meter as a disconnection device[3]. The contract Conectiv requires customer generators sign, notes that if the meter is "pulled" to isolate the customer's generation, that the customer will lose all utility service at the premises for the duration of the repair work. The terms require the customer to waive any liability against Conectiv for the loss of service. IREC sees this as a fair compromise between a mandatory requirement of an EDS on all customer generation systems.

Perhaps most telling of the minimal safety value of the EDS is that it provides no protection to line workers from the much more dangerous and perhaps prevalent safety risk – the unauthorized interconnection of a portable generator system. These generators, sold at home improvement centers and other retail establishments, have no protection whatsoever against back feeding and accidentally energizing a distribution circuit. The only piece of equipment needed to interconnect these generators to

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[3] See Conectiv Power Delivery – Technical Considerations Covering Parallel Operations of Customer Owned Generation, January 19, 2000.

the entire grid during an outage is an extension cord with a male plug on each end. Anyone with the most rudimentary knowledge of electrical wiring can build such a cord and potentially re-energize an entire distribution circuit. Including an EDS on every approved generator in the State would not protect line workers from these rogue interconnections. Utilities must implement procedures that provide protection from this eventuality and when they do, any safety value of an EDS will be insignificant.

With the rogue generator safety threat in mind, the Arkansas Public Service Commission decided that a "redundant visible, manual, lockable disconnect switch" did not need to be installed on customer's distributed generation facilities if that equipment met the IEEE requirements, was installed correctly and operated as designed. Despite a request for such a switch from every Arkansas utility and Commission Staff, the Commission reasoned that the safety requirements of IEEE were sufficient to ensure that distributed generation equipment would automatically disconnect when utility voltage "drops off"[4]. This decision is the most recent utility commission order that discusses the merits (or lack therof) of utility required external disconnect switches.

Conclusion

IREC requests the Department reject the requirement for an external disconnect switch unless a utility makes a showing that the switch is a critical part of their distribution safety procedures. IREC would suggest that if the Department decides to retain the option to allow unities to require an eternal disconnect switch under tariff section 4.2.4.1(b), that it at least strike the requirement on all inverter based generators under 10 kilowatts where the customer designates the meter as the alternative disconnection device. If the customer selects this alternative, IREC agrees that customers should be required to waive any liability against the utility for loss of service during the outage.

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[4] In the Matter of a Generic Proceeding to Establish Net Metering Rules, Arkansas Public Service Commission Docket no. 02-046-R Order no. 3, June 3, 2002.

Continued for signatures.

Respectfully submitted,

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